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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Haaland *et al.* Group: 2863  
Serial No.: 10/661,968 Paper No.:  
Filed: 09/11/2003 Examiner: John H. Le  
For: Augmented Classical Least Squares Multivariate Spectral Analysis

**RESPONSE TO RESTRICTION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Applicants have carefully reviewed the Office Action mailed 5/4/04 and submit the following in complete response thereto and request reconsideration of the restriction requirement.

**REMARKS**

In further support of the Claims presented, Applicants provide the following discussion.

The Office issued a restriction requirement:

- I. Claims 25-34, drawn to a method for analyzing multivariate spectral data, classified in class 702, subclass 23.
- II. Claims 35-38, drawn to a method of multivariate spectral analysis, classified in class 702, subclass 24.
- III. Claims 39-50, 75-86, drawn to a method of multivariate spectral analysis, classified in class 702, subclass 27.
- IV. Claims 51-62, drawn to a method of multivariate spectral analysis, classified in class 702, subclass 26.
- V. Claims 63-74, drawn to a method of multivariate spectral analysis, classified in class 702, subclass 25.

### ELECTION

In response to the restriction requirement, Applicants hereby provisionally elect with traverse to prosecute the **Invention III**, with traverse. Claims 39-50 and 75-86 all read on and comprehend a method of multivariate spectral analysis.

### ARGUMENTS

Applicants respectfully traverse the restriction requirement, since there is no undue burden on the Office to examine the Claims of Inventions I, II, IV and V, and they are not independent and distinct from the claims based on Invention III, which the Office must examine. To support a requirement for restriction, both two-way distinctiveness and reasons for insisting on restriction are necessary, i.e., separate classification, status, or field of search. *See* MPEP 808.

The Office asserted that Invention II is not related to Inventions I, III, IV, or V. Specifically, the Office asserted that these inventions have different functions. Invention II is merely a generalization of a family of methods that includes the embodiment of Invention I. *See* Application, page 9, lines 1-15; and page 18, line 15, through page 20, line 2. The function of all of these inventions is to analyze multivariate spectral data in order to obtain improved component values (i.e., concentrations) or spectra of the pure components in a mixture. *See* Application, page 7, lines 3-22 and Abstract. Accordingly, Applicants submit that these inventions are related.

The Office asserted that Inventions I and III, Inventions I and IV, Inventions I and V, Inventions III and IV, Inventions III and V, or Inventions IV and V are related as subcombinations disclosed as usable together in a single combination. *See* MPEP 806.05(d). Invention I is directed to the method of multivariate spectral analysis shown in Fig. 4. Inventions III, IV, and V are directed to the method of multivariate spectral analysis shown in Fig. 11. Applicants do not teach, nor do the claims recite, using these inventions in combination with each other. Applicants teach that these inventions can be used in combination with prediction-augmented classical least squares (PACLS), but that technique is the subject of U.S. Patent 6,415,233. *See* Application, page 2, lines 1-14, and page 3, lines 17-27.

Invention I requires that reference data (i.e., component values or concentrations in a calibration set) be available to implement the method recited in claim 25. *See* claim 25.a)i). The methods of Inventions III, IV, and V apply to the alternating least squares analysis of measured spectral data wherein no reference data is available. *See* claims 39.a), 75.a), 51.a), and 63.a). Therefore, Invention I cannot be used in combination with Inventions III, IV, or V, because reference data is not available in the analysis of measured spectral data for which Inventions III, IV, and V are applicable.

Furthermore, Inventions III, IV, and V are directed to stepwise variations of the method of multivariate spectral analysis shown in Fig. 11. These variants are not usable together in a single combination. For example, the claims of Inventions IV and V, for which the Office required restriction, recite different ways for starting the iteration, either starting by guessing pure-component spectra **K**, as recited in claim 51c), or by guessing a set of component values **C**, as recited in claim 63c). How the iteration is started determines the evolution of the steps of claims 51 and 63. Although the starting point is arbitrary, these inventions cannot be used in combination, since it is necessary to start with one or the other of the guesses, but not both. Furthermore, the Office asserted that claims 39-50 and 75-86 are directed to the same Invention III. However, these claims, for which the Office did not require restriction, also differ according to their initial guess. That is, claim 39c) starts by guessing pure-component spectra **K** and 75c) starts by guessing a set of component values **C**. How the steps of claims 39 and 75 evolve thereafter depends on these initial guesses, analogous to the evolution of claims 51 and 63.

Furthermore, Applicants submit that the Office's separate classifications of Inventions I, II, III, IV, and V are improper and arbitrary. The Office asserts that Invention I is classified in class 702, subclass 23 (Chemical analysis by quantitative determination); Invention II is classified in class 702, subclass 24 (Chemical analysis of a gaseous mixture); Invention III is classified in class 702, subclass 27 (Chemical analysis by molecular structure or composition determination); Invention IV is classified in class 702, subclass 26 (Chemical analysis by quantitative determination by particle count); and Invention V is classified in class 702, subclass 27 (Chemical analysis by quantitative determination of a liquid mixture). The inventions *as claimed* are not directed to separate subclasses, as asserted by the Office, but can each be used for all of the subclasses of chemical analysis in class 702, subclass 22. Indeed, all of these methods are applicable to the

analysis of a wide variety of multivariate spectral data. *See* Application, page 7, lines 3-22.

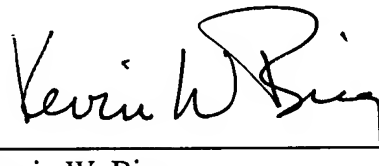
Accordingly, Applicants submit that the Office has not met its burden of setting forth a *prima facie* showing that there is an undue burden on the Office for not searching and examining the entire examination, as required by MPEP 803.

For the above reasons, Applicants respectfully submit that the restriction requirement is improper and therefore request reconsideration of the restriction requirement.

**CONCLUSION**

Applicants have responded to each and every requirement and urge that the Claims as presented are now in condition for allowance. Applicants request expeditious processing to issuance.

Respectfully submitted,



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**CERTIFICATION UNDER 37 CFR 1.8**

I hereby certify that this correspondence and documents referred to herein were deposited with the United States Postal Service as first class mail addressed to: Commissioner for Patents, Alexandria, VA 22313 on the date shown below.

Date: 6/2/04 By: Martha Trujillo